



Expedient Road Construction For Logistics- Over-The-Shore Operations

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Expedient Road Construction For LOTS Operations

Objective:

- ▮ Develop Solutions for Military Road Construction Over Loose

Sandy Soil and Very Soft Soil

Requirements:

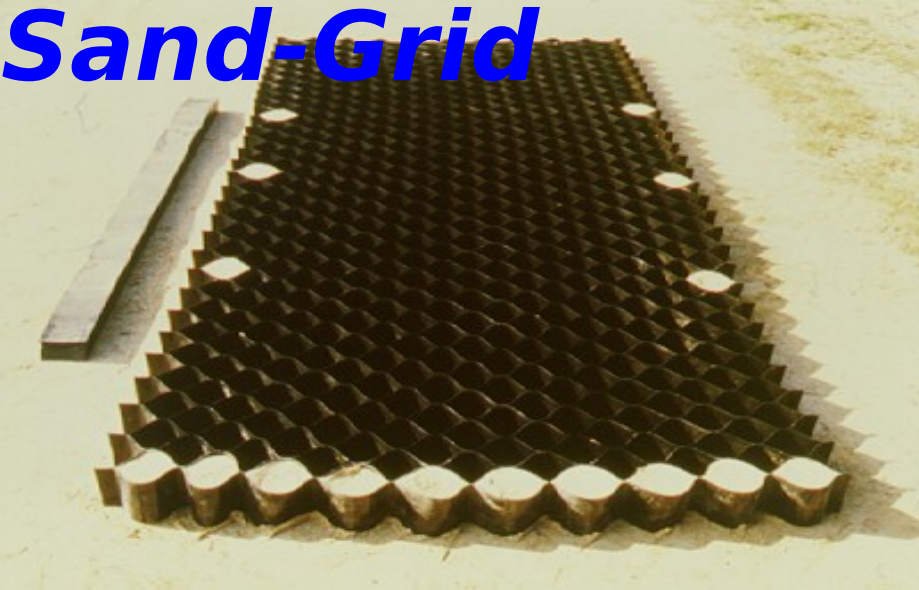
- ▮ Expedient
- ▮ Reduced Logistical Footprint - Less Weight, Volume, Cost
- ▮ Support 2,000 Channelized Truck Passes

Approach:

- ▮ Evaluate Commercially-Available Materials
- ▮ Design Alternative Pavement Sections
- ▮ Evaluate Alternatives Under Full-Scale Traffic Conditions

EXISTING TECHNOLOGIES

Sand-Grid



Uni-Mat



Mo-Mat



Steel Mat



- # → Special Allround

GEOFIBER STABILIZATION

Level



Place



Spread



Mark



GEOFIBER STABILIZATION

Mix



Moisture



Ready for traffic



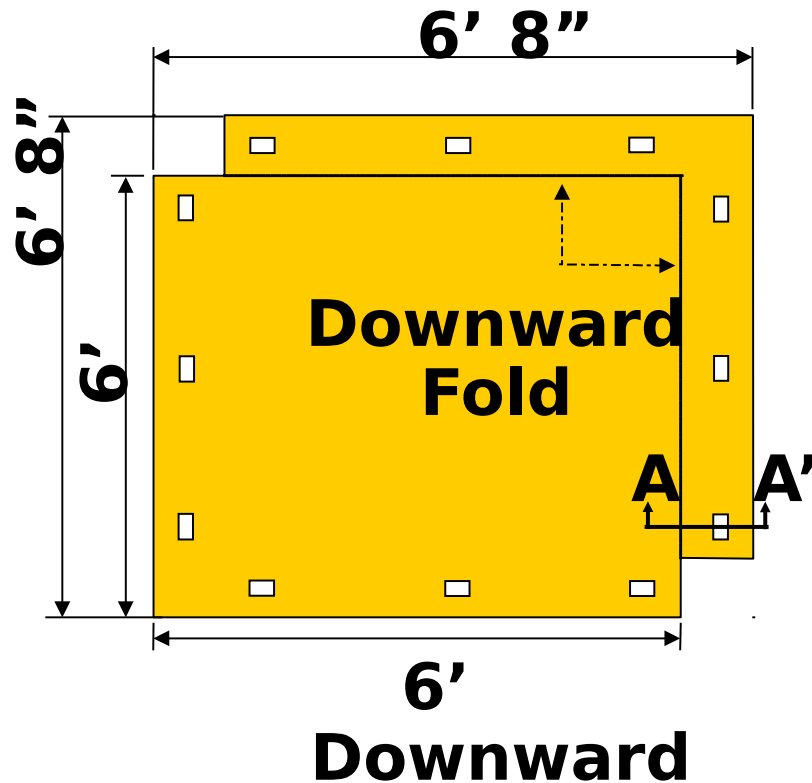
Compact



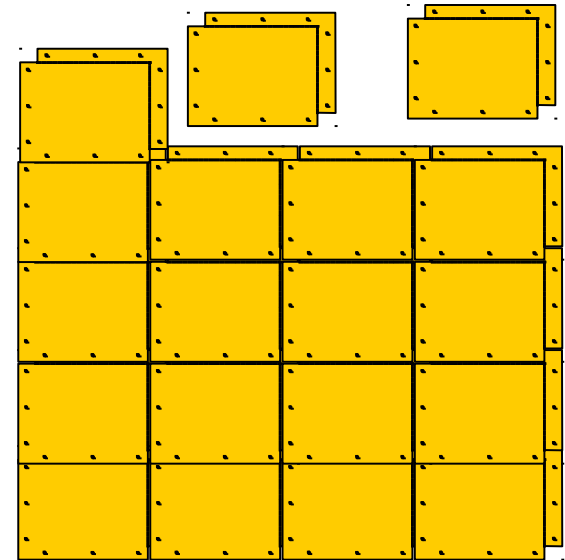
GEOFIBER STABILIZATION

- **Geofiber** stabilization is effective for **heavy traffic**
- **Thickness requirement:**
 - ➔ **C130 aircraft - 12 in.**
 - ▮ **Military truck - 8 in.**
- **Fiber requirement:**
 - ▮ **C130 aircraft - 1.0% by dry weight**
 - ▮ **Military truck - 0.8% by dry weight**

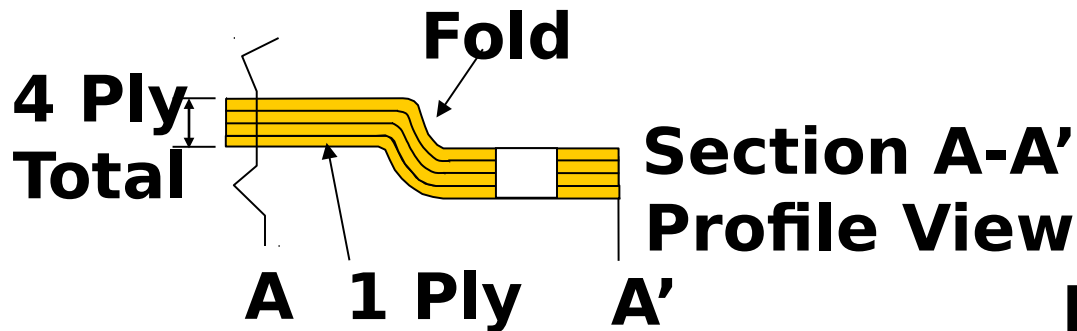
MULTI-PURPOSE MAT ROAD



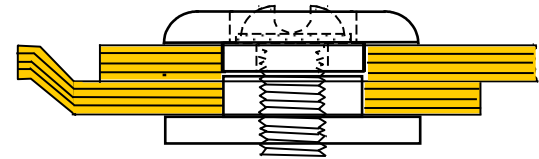
Plan View



24' Wide Road



Section A-A'
Profile View



Mat With Pin Connector

MULTI-PURPOSE MAT ROAD

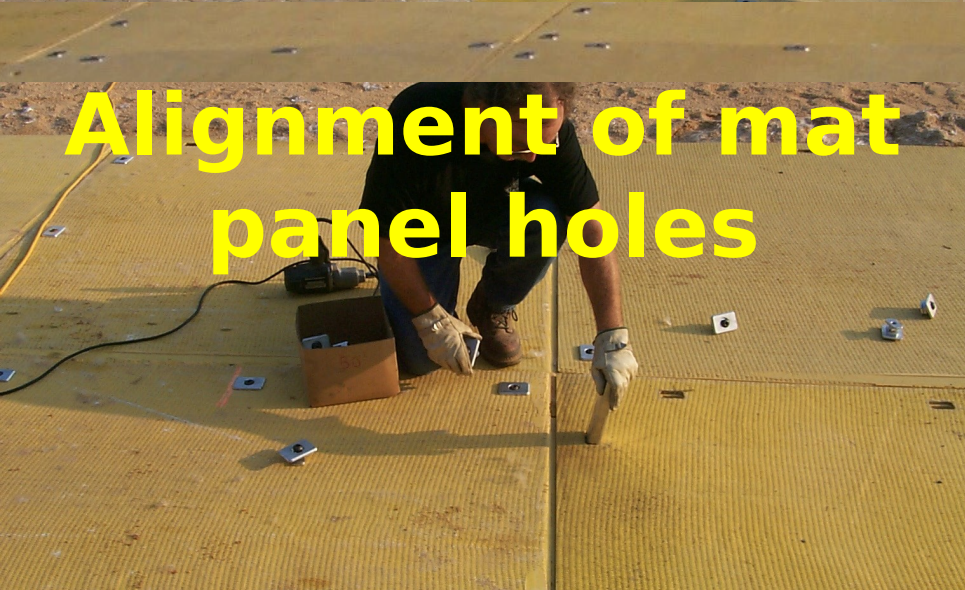
Installation



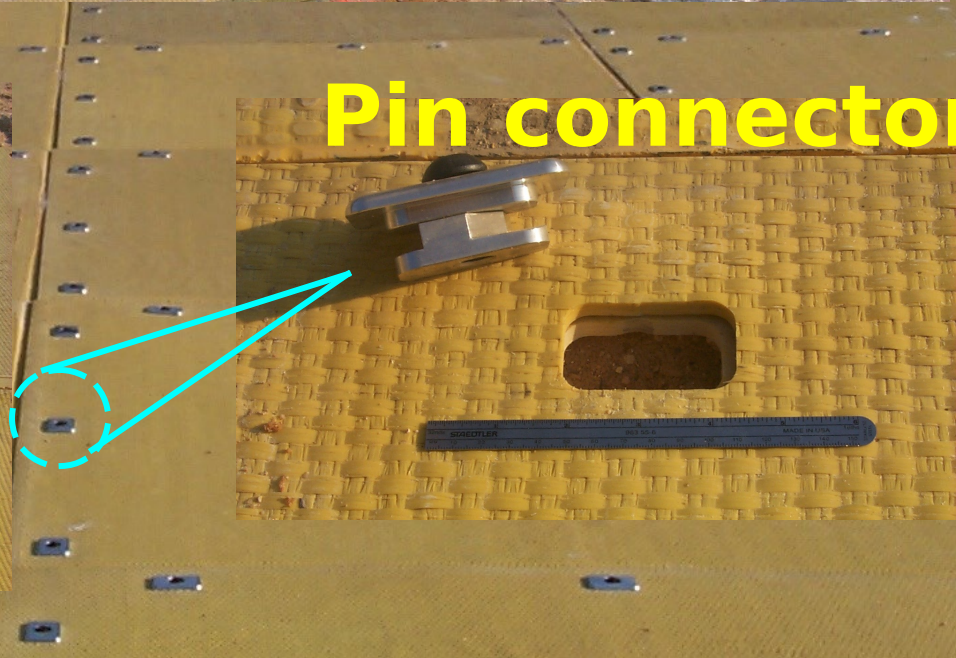
Installation using Alignment tools



Alignment of mat panel holes



Pin connector



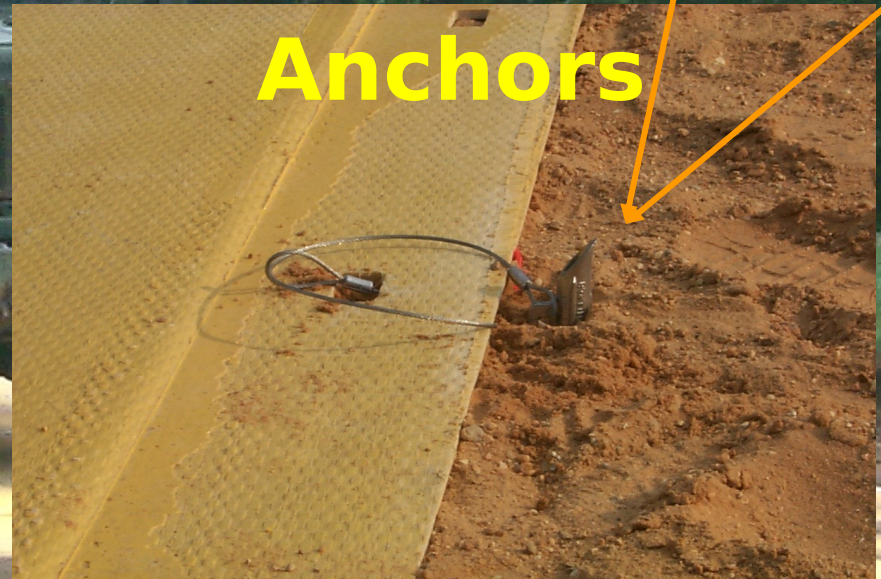
MULTI-PURPOSE MAT ROAD

Ready for traffic

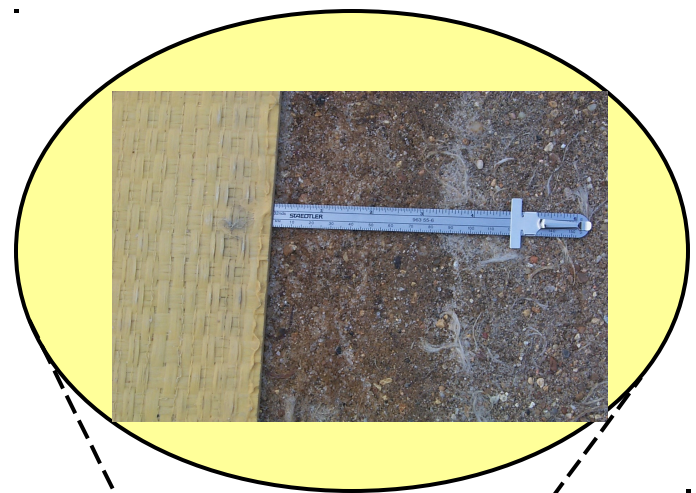
Tightening of pin
connector



Anchors



MULTI-PURPOSE MAT ROAD



HEXAGONAL MAT ROAD

Unloading Mats



Delivering Mats



Ready for Traffic



Installation



Compaction



HEXAGONAL MATS

Panel surface

Special

Allround

Special

Allround

Back of panel

Special

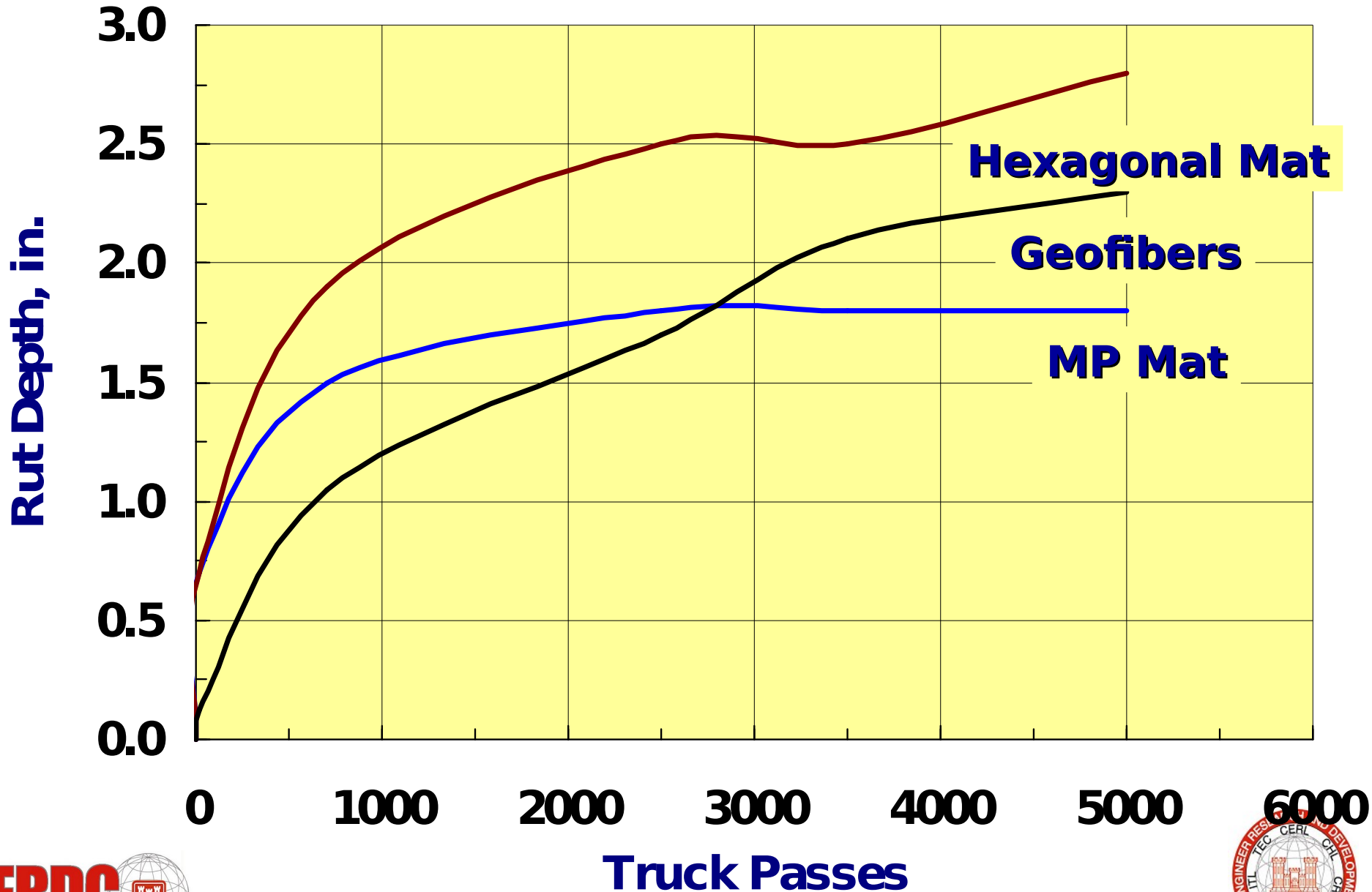
Special

Allround

HEXAGONAL MATS



TECHNOLOGIES PERFORMANCE



JLOTS - NATIVE ATLAS EXERCISE

Multi-Purpose Mat Supporting 3rd ID Beach Cro





LOGISTIC ISSUES: Containers



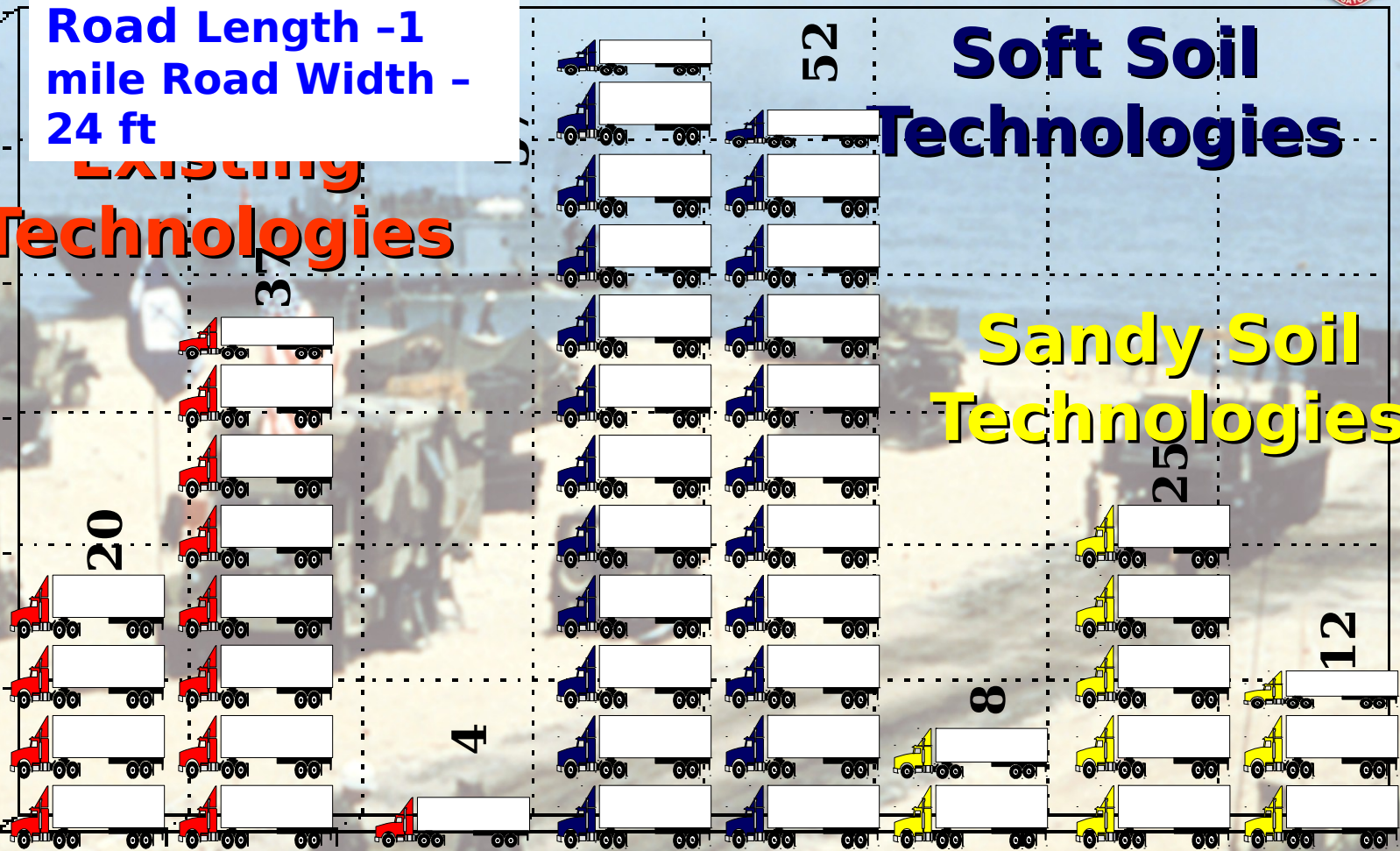
Road Length - 1
mile Road Width -
24 ft

Existing
Technologies

Soft Soil
Technologies

Sandy Soil
Technologies

Containers



Steel Mat

Mo-Mat

Sand-Grid

DuraBase

Uni-Mat

MP Mat

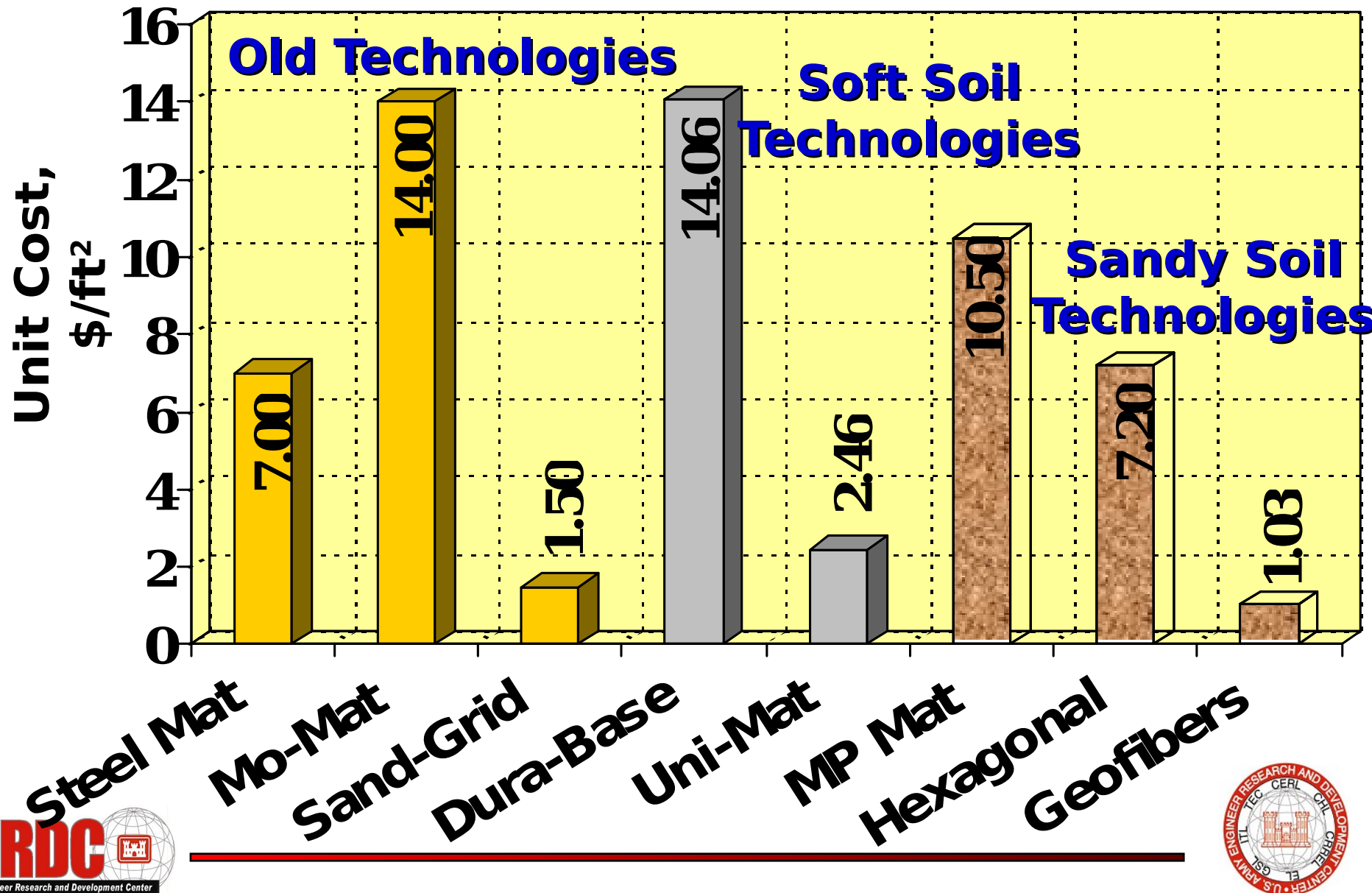
Hexagonal

Geofiber

One Corps, One Regiment, One Team

Serving Soldiers, the
Army, the Nation

LOGISTICS ISSUES: Unit Cost per 1 Mile of Road



Road Construction Over **Very Soft Soil**

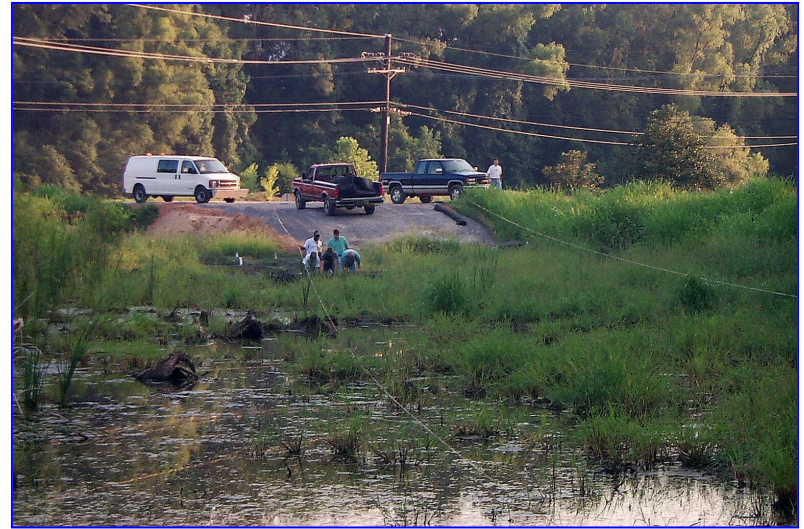
Concept Behind the Research: Logistics-Over-The-Shore



How Soft is Very Soft Soil?

Construction Alternatives:

- Bypass Obstacle
- Use Tactical Bridging
- Remove & Replace
- **Develop Expedient Road Construction**

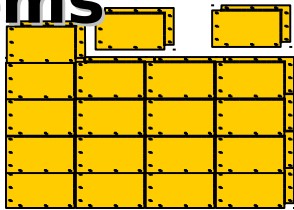


Expedient Road Construction - Approach

CONSTRUCT TEST SECTIONS TO EVALUATE:

- **Geosynthetic Road Construction Products**
 - ✓ Geotextiles
 - ✓ Geogrids
 - ✓ Geofoam
 - ✓ Geofibers
 - ✓ Excogitated Composite Multifunctional (ECM) Material

- **Expedient Mat Systems**



Multi-Purpose Mat



DURA-BASE Mat

- **Lightweight Fills**

- ✓ Sand
- ✓ Wood Chips

Test Section Construction

Site Preparation



Test Section Construction

Traffic Lane 1 Construction - CBR < 0.5



Walkways



Place Mats



Test Section Construction

Traffic Lane 2 Construction - 1 > CBR > 0.5



Test Section Traffic

Test Traffic:

- 5-Ton Truck
- 42-Kip Gross Load
- 2,000 Truck Passes



SOFT SOIL CONCLUSIONS

- **2-Layers of DURA-BASE or SOLOCO's Wood Mat Can Sustain 2,000 Military Truck Passes Over a 0.5+ CBR Subgrade**
- **Crushed Limestone (30 in.)/Geogrid/Geotextile Can Sustain 2,000 Military Truck Passes Over a 0.5+ CBR Subgrade**
- **The ECM and Geofoam Products Are Not Suitable For Soft Soil Construction**
- **Lightweight Wood Chips Provide A Drainable Fill With Significant Load Distribution Characteristics**
- **Stiff Geogrids Can Be Used As Construction Platforms**
- **The Logistical Footprint Must Be Considered & Is Large For Soft Soils**

SANDY SOIL SUMMARY

- **Four Solutions for Sandy Soil Stabilization**
 - ➔ **Geofiber Stabilization**
 - ▮ **Multi-Purpose Mat**
 - ▮ **Plastic Hexagonal Mat**
 - ▮ **Sand Grid**
- **Benefits of the New Technologies**
 - ▮ **Reduce construction time, manpower, and cost**
 - ▮ **No required special construction skills**

SOFT SOIL SUMMARY

ntial Solutions for **Soft Soil** Stabilization Include

- **Subgrades With $1 > \text{CBR} > 0.5$:**
 - **Crushed Stone/Geogrid/Geotextile**
 - **Plastic DURA-BASE Mat/Geotextile**
 - **Wood SOLOCO Mat/Geotextile**

- **Subgrades With $\text{CBR} < 0.5$:**
 - **Crushed Stone/Geogrid/Wood Chips*/Geotextile**
 - **Plastic DURA-BASE Mat/Wood Chips*/Geogrid/Geotextile**
 - **Wood SOLOCO Mat/Wood Chips*/Geogrid/Geotextile**

QUESTIONS

